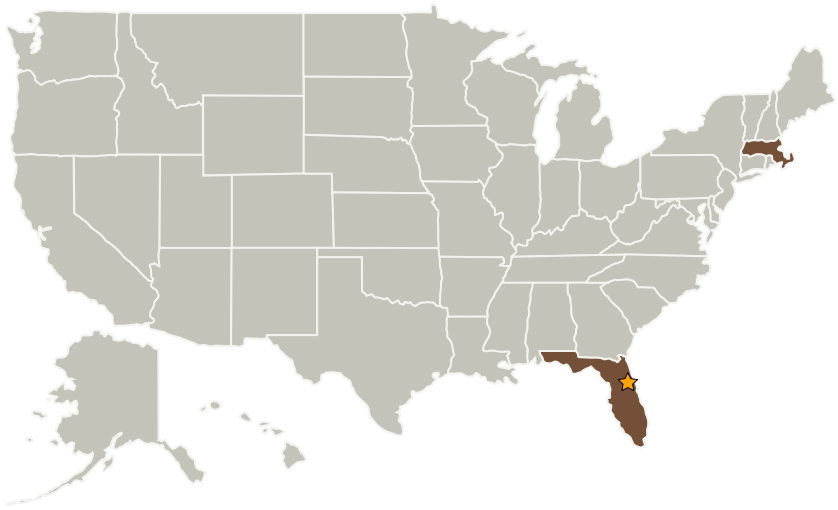
Ormosil Beads for Insulation of Ground Cryogenic Storage Tanks, Phase I

Completed Technology Project (2004 - 2004)

Project Introduction

Advanced materials are required to insulate cryogenic storage and distribution systems for liquid propellants such as hydrogen and oxygen, used in orbital transfer and interplanetary missions. Development of cost effective, robust cryogenic insulation systems that operate at soft vacuum level constitutes a main target for NASA from the energy and economics point of view. The lightweight aerogel materials developed by Aspen Aerogels Inc. have already demonstrated excellent insulation performance at both ambient and low pressures. Aspen Aerogels proposes to develop novel organically modified aerogel beads with superior compression resistance that will successfully replace perlite insulation in large ground tanks for storage of liquid propellants. The lightweight ormosil beads with optimized thermal conductivity at cold vacuum pressures will help extend the propellants storage life. Additionally, the stiff beads are not easily crushable and unlike perlite, will not settle in the vacuum jacket. Reducing boil-off losses at moderate vacuum level will minimize total storage cost for cryogenic fluids. It is anticipated that the proposed solution will result in over 80% reduction of the insulation areal density and save 40% in cost over Perlite.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Kennedy Space Center (KSC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Kennedy Space Center(KSC)	Lead Organization	NASA Center	Kennedy Space Center, Florida
Aspen Aerogels, Inc.	Supporting Organization	Industry	Northborough, Massachusetts

Primary U.S. Work Locations	
Florida	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Roxana Trifu

Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.3 Cryogenic